

WHAT IS CLAIMED:

1. A Dynamic Random Access Memory (DRAM) device comprising:
a DRAM cell array configured to be periodically refreshed; and
a refresh control circuit configured to issue an internal refresh command to the
5 DRAM cell array to provide periodic refresh of the DRAM cell array and configured
to provide a refresh information signal to external of the DRAM device before the
internal refresh command is issued to the DRAM cell array.
2. A device according to Claim 1 wherein the refresh information signal
10 is transmitted to a memory controller configured to issue operation commands to the
DRAM device.
3. A device according to Claim 1 wherein the memory cell array is
refreshed a predetermined time after the refresh information signal is activated.
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4. A device according to Claim 3 wherein an external command received
by
the DRAM device during the predetermined time is carried out before the periodic
refresh operation is carried out in the DRAM cell array.
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5. A device according to Claim 1 wherein the predetermined time is
configured to allow a current memory operation in an external memory controller to
complete before initiating the refresh operation in the DRAM cell array.
- 25 6. A device according to Claim 3 wherein refresh information signal is
deactivated responsive to the refresh operation in the DRAM cell array being
completed.
7. A method of controlling a refresh operation of DRAM device, the
30 method comprising:
providing a refresh information signal to external of the DRAM device before
an internal refresh command is issued to a DRAM cell array.

8. A method according to Claim 7 wherein the refresh information signal is transmitted to a memory controller that external to the DRAM device.

9. A method according to Claim 7 wherein the DRAM cell array is
5 refreshed a predetermined time after the refresh information signal is activated.

10. A method according to Claim 9 further comprising:
delaying the refresh operation in the DRAM cell array if an external command
is received by the DRAM device during the predetermined time.
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11. A method according to Claim 7 wherein after the refresh information
signal is activated, an operation according to an initially input external command is
performed before the memory cell array is refreshed.

12. A method according to Claim 9 further comprising:
deactivating the refresh command responsive to completion of the refresh
operation the DRAM cell array.
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